Work Order ID 75640

October-27-11 11:41:23 AM

75640

Item ID: D6010-115 **Accept** *N900040100* **Setup Start** *NS1*

Revision ID: **Stop** *NS2*

Item Name: Crosstube Material

Start Date: 27/10/2011 **Start Qty:** 20.00 *20* 24X

Required Date: 30/07/2013 **Req'd Qty:** 20.00 *20*

Reference: **Cust Item ID:** **Customer:**

Approvals: **Process Plan:** M.L.J **Date:** 11/10/27 **Tooling:** _____ **Date:** _____ **Run Start** *NR1*

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop** *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	**Revision Nbr**								
D6010	Rev A								
100		0.00							
100	PURCHASING								
Purchasing						CL	111103	20	
Purchasing	**Memo**	0.00							
	Issue P/O: 15350 a) Order as per Dwg D6010b) Material: 2.250 x 0.320 wall 7075-T6/T6511 (WW-T-700/7 or QQ-A-225/9 or QQ-A-200/11) seamless aluminum tube c) Minimum ultimate tensile strength = 77 ksi d) Minimum tensile yield strength = 66 ksi								
110	Receive & Inspect for Damage & Mat'l Certs	0.00							
110						24X			
Packaging									
Packaging	**Memo**	0.00							
	Ensure material certification is attached							13-5-30	
120	QC6- Inspect dimensions to drawing	0.00							
120									
QC									
Quality Control	**Memo**	0.00 DAS 16 9-89	136665						
	Ensure Material certification comply to Dwg								

see attached material inspection sheet

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Work Order ID 75640

October-27-11 11:41:23 AM

75640

Item ID: D6010-115 **Accept** *N900040100* **Setup Start** *NS1*

Revision ID:

Item Name: Crosstube Material **Stop** *NS2*

Start Date: 27/10/2011 **Start Qty:** 20.00 *20*

Required Date: 30/07/2013 **Req'd Qty:** 20.00 *20*

Reference:

Cust Item ID:

Customer:

Run Start *NR1*

Stop *NR2*

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	Chemical Conversion Coat per QSI005 4.1	0.00							
130									
HandFinish	**Memo**	0.00							
Hand Finishing									
140	Identify as per dwg & Stock Location: L/6	0.00							
140									
Packaging	**Memo**	0.00							
Packaging									
150	QC21- Final Inspection - Work Order Release	0.00							
150									
QC	**Memo**	0.00							
Quality Control									

13/06/06

13/6/11

13-6-10

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

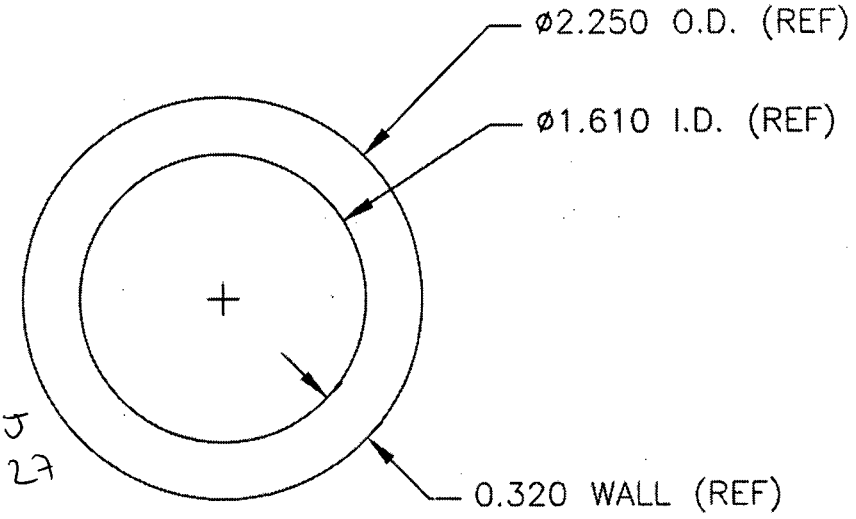
NOTE: Date & initial all entries

DESIGN	DRAWN BY RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED	APPROVED	DRAWING NO. D6010	REV. A SHEET 1 OF 1
DATE 01.08.16		TITLE CROSSTUBE MATERIAL	SCALE 1:1
A	01.08.16	NEW ISSUE	

SPECIFICATION CONTROL DRAWING

RELEASED
01.08.17

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO 75640 M.L.J
11/10/27



NOTES

1) D6010–XXX CROSSTUBE
LENGTH

WHERE XXX IS LENGTH IN INCHES
EG. 115" LONG TUBE: D6010–115

2) MATERIAL: 2.250 OD x 0.320 WALL 7075–T6/T6511 (WW–T–700/7 OR QQ–A–225/9 OR QQ–A–200/11) SEAMLESS ALUMINUM TUBE.
MINIMUM ULTIMATE TENSILE STRENGTH = 77 ksi
MINIMUM YIELD TENSILE STRENGTH = 66 ksi
3) TOLERANCES ARE PER ASTM B210 AS FOLLOWS:
O.D.: ± 0.006 MEAN (±0.012 INCLUDING OVALITY)
WALL: ±0.015 MEAN (±0.032 INCLUDING ECCENTRICITY)
LENGTH: XXX +0.125/–0.000
STRAIGHTNESS: 0.010" DEVIATION / 12" LENGTH
4) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
5) CHEMICAL CONVERSION COAT PER DART QSI 005 4.1

Copyright © 2001 by DART AEROSPACE LTD
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

ckinglist ALUnna AG

ALUnna

ına ref. no.	44993/100
omer PO.	PO. 15350
:	04.29.13

Boxmarking:

Dart Aerospace PO. 15350 D 6010-115
Made in Germany
Dest. Hawkesbury Ont., Canada

ıereby declare that the wooden packing material are totally free from bark and apparently from live plant pests

ı no.	Box no.	OD (inch)	ID (inch)	Wall (inch)	Net Weight (lbs)	Tare lbs	Gross Weight	Pieces	lengths (ft)	Boxdimension Lengths (inch)	Width (inch)	height (inch)	Cast. / Heat No. Top	Pcs.	Cast. / Heat No. Middle	Pcs.	Cast. / Heat No. Bottom	Pcs.
00	1	2,250	1,610	0,320	533	263	797	24	10	151,575	22,441	22,441			8934/1302304	24		
					533	**263**	**797**	**24**				1,251 m³						

SR13530

:\VERSAND\USA_Packliste\44993_100

Abnahmeprüfzeugnis 3.1 - DIN EN 10204:2005

Inspection Certificate 3.1 - DIN EN 10204:2005 / Certificat de Reception 3.1- DIN EN 10204:2005

Kunde: *Client:* Dart Aerospace Ltd.

1270 Aberdeen Street
K6A1K7 Hawkesbury, ON Canada

Zeugnisnummer: *Cert No.: / No. du certificat:* 332/13

Bestellnummer: *Order No. / No. de commande* PO15350

Auftrag: *Our Reference/Notre Reference:* 44993/100

Produkt: *Product / Produit:* Rohre nahtlos gepresst / *Tubes seamless extruded*

Spezifikation: *Specification:* AMS - QQ - A - 200/11; Spezifikation Dart Aerospace D6010

Werkstoff: *Alloy/Alliage:* 7075

Zustand: *Temper/État* T 6511

Abmessung *Size / Dimension* 2,250 INCH x 1,610 INCH x 0,320 INCH x 115,000 INCH
D6010-115

Kennzeichnung *Marking/Marquage:* ALUnna - Cert No. 332/13 - 7075-T6511 - Cast No. 8934 - AMS QQA - 200/11E - 2.250" OD X 0.320" Wall - Heat Lot No. 1302304 - ALUnna Order Conf. No. 44993/100-1 PO. 15350

Lieferung *Delivered Material / Matérial délivre:* pcs. 24 lbs 533

Country of Manufacture: Germany
Products are in accordance with applicable RoHS

1. Chemische Analyse — *Chemical Analysis / analyse chimique*

Other elements each max. 0,05 %, total 0,15 %

Charge/ Cast No.		Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Pb	Zr	Bi	Sn	Ni
	min.			1,2		2,1	0,18	5,1						
	max.	0,40	0,50	2,0	0,30	2,9	0,28	6,1	0,20					
8934/13		0,110	0,196	1,417	0,077	2,449	0,200	5,565	0,033	0,003	0,0129	0,0001	0,0018	0,0001

Hydrogen content: 0,08 **ccm/100 g Al** Elements without indication < 0,01 % **country of melt manufacturer: Germany**

2. Mechanische Eigenschaften — *Mechanical Properties / Valeurs Mécaniques*

Anforderungen Requirements		tensile (Rm) ksi	yield (Rp0,2) ksi	elongation 2" %	elongation A %	Hardness HB	Heat Lot No.
	min.	77,0	66,0	7,0			
	max.						
1		83,955	76,415	7,0			1302304

RMS outside 25 - max. 7,4 µ"

Ergebnis der Prüfungen: Es wird bestätigt, daß die Lieferung geprüft wurde und den Vereinbarungen bei der Bestellannahme entspricht

Test results: We confirm that the delivery has been tested and applies to the agreements made on receipt of the order

Resultats: Nous confirmons que la livraison a été controlée et correspond avec les conventions faites à la réception de la commande

mergardtri

12.03.2013

Certified acc. DIN EN ISO 9001:2008 and DIN EN 9100:2003
valid until 2013-11-10
Cert.- Reg. No.: 001959 QM08; 001959 ASH

ALUnna

Abnahmebeauftragter

DART aerospace
Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID PO15350

Purchase Order Date 11/03/11
PO Print Date 12/07/11

Order From : VU-ALU001

ALUMINIUMWERK UNNA AG
630 3033 SOUTH PARKER RD
AURORA, CO 80014
USA

Contact Name		**Buyer**	Chantal Lavoie
Vendor Phone	303 755 5672	**Requisition Nbr**	
Vendor Fax	303 755 5936	**Tax Resale Nbr**	10127-2607
Vendor Account Nbr		**Terms**	Net 30
		Currency	USD
		FOB	Destination-Collect

Ship To : DART AEROSPACE LTD 1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

RELISED

Line Nbr	Reference / Revision ID / Vendor Part Number	Description/ Mfg ID	Req Date/ Taxable	Req Qty/ Unit of Measure	Ship Method	Unit Price	Extended Price
1	D6010-115P	Crosstube Material	4/30/13 Yes	20.00 Each		$336.0000	$6,720.00

recu 24x SP13-5-

Special Inst: AS PER DWG D6010 REV. A
B75640
MATERIAL: 7075-T6/T6511 AS PER WW-T-700/7 OR
QQ-A-200/11 OR QQ-A-225/9 SEAMLESS TUBE
MINIMUM ULTIMATE TENSILE STRENGTH = 77 KSI
MINIMUM TENSILE YIELD STRENGTH = 66 KSI
SIZE: 2.250" OD X 0.320" WALL X 115" LONG

2	D6009-129P	Crosstube Material	4/30/13 Yes	20.00 Each		$996.0000	$19,920.00

recu 21x SP13-5-3

No substitution or deviation without consent.
Certificate of Conformity or Material Certification required when applicable

Change Nbr: 2 **Change Date:** 12/07/11

EXTRUSION INSPECTION SHEET

		SIDE A	SIDE B					ULTRA SONIC MEASURMENTS				
TUBE #	TOTAL LENGTH	DIA two readings	DIA two readings	INSIDE DIA	wall thickness measured w/vern	Strightness at 12"in middle	Rockwell Reading	LOCATION on tube	R1	R2	R3	R4
DWG	115.00"	2.250"		1.610"	0.320"	0.010"	N/A	Middle	N/A			
1	115.00"	2.251"/2.249"	2.253"/2.249"	1.606"	0.328"/0.311"	0.002"	N/A	Middle	0.333"	0.316"	0.314"	0.329"
2	115.00"	2.253"/2.250"	2.255"/2.249"	1.610"	0.328"/0.311"	0.0045"	N/A	Middle	0.319"	0.317"	0.325"	0.322"
3	115.00"	2.251"/2.248"	2.249"/2.245"	1.601"	0.324"/0.316"	0.0045"	N/A	Middle	0.312"	0.329"	0.332"	0.311"
4	115.00"	2.256"/2.244"	2.254"/2.248"	1.606"	0.329"/0.315"	0.004"	N/A	Middle	0.327"	0.325"	0.320"	0.317"
5	115.00"	2.250"/2.246"	2.253"/2.249"	1.608"	0.324"/0.317"	0.003"	N/A	Middle	0.310"	0.327"	0.331"	0.319"
6	115.00"	2.250"/2.245"	2.251"/2.248"	1.604"	0.324"/0.314"	0.003"	N/A	Middle	0.324"	0.329"	0.327"	0.315"
7	115.00"	2.250"/2.248"	2.256"/2.251"	1.607"	0.326"/0.315"	0.002"	N/A	Middle	0.314"	0.326"	0.327"	0.322"
8	115.00"	2.251"/2.246"	2.253"/2.245"	1.609"	0.317"/0.314"	0.0045"	N/A	Middle	0.317"	0.329"	0.326"	0.312"
9	115.00"	2.247"/2.242"	2.250"/2.249"	1.606"	0.323"/0.314"	0.004"	N/A	Middle	0.315"	0.324"	0.327"	0.325"
10	115.00"	2.251"/2.247"	2.253"/2.249"	1.608"	0.325"/0.312"	0.002"	N/A	Middle	0.310"	0.317"	0.334"	0.326"
11							N/A	Middle				
12							N/A	Middle				
13							N/A	Middle				
14							N/A	Middle				
15							N/A	Middle				
PART # D6010-115		P/O# 15350			BATCH # B75640			Notes:				

MEAN OUTSIDE DIAMETER PERMISSIBLE +- 0.006 side A									
Tube #	Actual A	Actual B	Mean	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.251	2.249	2.250	2.250	0.006	2.244	2.256	0.006	-0.006
2	2.253	2.250	2.252	2.250	0.006	2.244	2.256	0.007	-0.004
3	2.251	2.248	2.250	2.250	0.006	2.244	2.256	0.006	-0.006
4	2.256	2.244	2.250	2.250	0.006	2.244	2.256	0.006	-0.006
5	2.250	2.246	2.248	2.250	0.006	2.244	2.256	0.004	-0.008
6	2.250	2.245	2.248	2.250	0.006	2.244	2.256	0.003	-0.008
7	2.250	2.248	2.249	2.250	0.006	2.244	2.256	0.005	-0.007
8	2.251	2.246	2.249	2.250	0.006	2.244	2.256	0.004	-0.007
9	2.247	2.242	2.245	2.250	0.006	2.244	2.256	0.000	-0.011
10	2.251	2.247	2.249	2.250	0.006	2.244	2.256	0.005	-0.007
11			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
12			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
13									
14									
15									
16									

OUTSIDE DIA. Permissible (with Ovality) +- 0.012 side A							
Tube #	Actual A	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.251	2.250	0.012	2.238	2.262	0.013	-0.011
2	2.253	2.250	0.012	2.238	2.262	0.015	-0.009
3	2.251	2.250	0.012	2.238	2.262	0.013	-0.011
4	2.256	2.250	0.012	2.238	2.262	0.018	-0.006
5	2.250	2.250	0.012	2.238	2.262	0.012	-0.012
6	2.250	2.250	0.012	2.238	2.262	0.012	-0.012
7	2.250	2.250	0.012	2.238	2.262	0.012	-0.012
8	2.251	2.250	0.012	2.238	2.262	0.013	-0.011
9	2.247	2.250	0.012	2.238	2.262	0.009	-0.015
10	2.251	2.250	0.012	2.238	2.262	0.013	-0.011
11			0.012	-0.012	0.012	0.012	-0.012
12			0.012	-0.012	0.012	0.012	-0.012
13							
14							
15							
16							

OUTSIDE DIA. Permissible (with Ovality) +- 0.012 side A							
Tube #	Actual B	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.249	2.250	0.012	2.238	2.262	0.011	-0.013
2	2.250	2.250	0.012	2.238	2.262	0.012	-0.012
3	2.248	2.250	0.012	2.238	2.262	0.010	-0.014
4	2.244	2.250	0.012	2.238	2.262	0.006	-0.018
5	2.246	2.250	0.012	2.238	2.262	0.008	-0.016
6	2.245	2.250	0.012	2.238	2.262	0.007	-0.017
7	2.248	2.250	0.012	2.238	2.262	0.010	-0.014
8	2.246	2.250	0.012	2.238	2.262	0.008	-0.016
9	2.242	2.250	0.012	2.238	2.262	0.004	-0.020
10	2.247	2.250	0.012	2.238	2.262	0.009	-0.015
11			0.012	-0.012	0.012	0.012	-0.012
12			0.012	-0.012	0.012	0.012	-0.012
13							
14							
15							
16							

MEAN OUTSIDE DIAMETER PERMISSIBLE +- 0.006 Side B									
Tube #	Actual A	Actual B	Mean	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.253	2.249	2.251	2.250	0.006	2.244	2.256	0.007	-0.005
2	2.255	2.249	2.252	2.250	0.006	2.244	2.256	0.008	-0.004
3	2.249	2.245	2.247	2.250	0.006	2.244	2.256	0.003	-0.009
4	2.254	2.248	2.251	2.250	0.006	2.244	2.256	0.007	-0.005
5	2.253	2.249	2.251	2.250	0.006	2.244	2.256	0.007	-0.005
6	2.251	2.248	2.250	2.250	0.006	2.244	2.256	0.006	-0.006
7	2.256	2.251	2.254	2.250	0.006	2.244	2.256	0.009	-0.002
8	2.253	2.245	2.249	2.250	0.006	2.244	2.256	0.005	-0.007
9	2.250	2.249	2.250	2.250	0.006	2.244	2.256	0.006	-0.006
10	2.253	2.249	2.251	2.250	0.006	2.244	2.256	0.007	-0.005
11			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
12			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
13									
14									
15									
16									

OUTSIDE DIA. Permissible (with Ovality) +- 0.012 side b							
Tube #	Actual A	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.253	2.250	0.012	2.238	2.262	0.015	-0.009
2	2.255	2.250	0.012	2.238	2.262	0.017	-0.007
3	2.249	2.250	0.012	2.238	2.262	0.011	-0.013
4	2.254	2.250	0.012	2.238	2.262	0.016	-0.008
5	2.253	2.250	0.012	2.238	2.262	0.015	-0.009
6	2.251	2.250	0.012	2.238	2.262	0.013	-0.011
7	2.256	2.250	0.012	2.238	2.262	0.018	-0.006
8	2.253	2.250	0.012	2.238	2.262	0.015	-0.009
9	2.250	2.250	0.012	2.238	2.262	0.012	-0.012
10	2.253	2.250	0.012	2.238	2.262	0.015	-0.009
11			0.012	-0.012	0.012	0.012	-0.012
12			0.012	-0.012	0.012	0.012	-0.012
13							
14							
15							
16							

OUTSIDE DIA. Permissible (with Ovality) +- 0.012 side b							
Tube #	Actual B	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.249	2.250	0.012	2.238	2.262	0.011	-0.013
2	2.249	2.250	0.012	2.238	2.262	0.011	-0.013
3	2.245	2.250	0.012	2.238	2.262	0.007	-0.017
4	2.248	2.250	0.012	2.238	2.262	0.010	-0.014
5	2.249	2.250	0.012	2.238	2.262	0.011	-0.013
6	2.248	2.250	0.012	2.238	2.262	0.010	-0.014
7	2.251	2.250	0.012	2.238	2.262	0.013	-0.011
8	2.245	2.250	0.012	2.238	2.262	0.007	-0.017
9	2.249	2.250	0.012	2.238	2.262	0.011	-0.013
10	2.249	2.250	0.012	2.238	2.262	0.011	-0.013
11			0.012	-0.012	0.012	0.012	-0.012
12			0.012	-0.012	0.012	0.012	-0.012
13							
14							
15							
16							

end measuement with vern

Mean OUTSIDE DIA. Permissible +- 0.015									
Tube	Actual A	Actual B	Mean	Nominal	Tolerance	min	max	min	max
1	**0.328**	**0.311**	**0.320**	**0.320**	**0.015**	**0.305**	**0.335**	**0.0145**	**-0.016**
2	**0.328**	**0.311**	**0.320**	**0.320**	**0.015**	**0.305**	**0.335**	**0.0145**	**-0.016**
3	**0.324**	**0.316**	**0.320**	**0.320**	**0.015**	**0.305**	**0.335**	**0.015**	**-0.015**
4	**0.329**	**0.315**	**0.322**	**0.320**	**0.015**	**0.305**	**0.335**	**0.017**	**-0.013**
5	**0.324**	**0.317**	**0.321**	**0.320**	**0.015**	**0.305**	**0.335**	**0.0155**	**-0.015**
6	**0.324**	**0.314**	**0.319**	**0.320**	**0.015**	**0.305**	**0.335**	**0.014**	**-0.016**
7	**0.326**	**0.315**	**0.321**	**0.320**	**0.015**	**0.305**	**0.335**	**0.0155**	**-0.015**
8	**0.317**	**0.314**	**0.316**	**0.320**	**0.015**	**0.305**	**0.335**	**0.0105**	**-0.020**
9	**0.323**	**0.314**	**0.319**	**0.320**	**0.015**	**0.305**	**0.335**	**0.0135**	**-0.017**
10	**0.325**	**0.312**	**0.319**	**0.320**	**0.015**	**0.305**	**0.335**	**0.0135**	**-0.017**
11			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
12			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
13			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
14			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
15			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!

OUTSIDE DIA. Permissible +- 0.038								
Tube	Actual A	Actual B	Nominal	Tolerance	min	max	min	max
1	**0.328**	**0.311**	**0.320**	**0.038**	**0.282**	**0.358**	**0.046**	**-0.047**
2	**0.328**	**0.311**	**0.320**	**0.038**	**0.282**	**0.358**	**0.046**	**-0.047**
3	**0.324**	**0.316**	**0.320**	**0.038**	**0.282**	**0.358**	**0.042**	**-0.042**
4	**0.329**	**0.315**	**0.320**	**0.038**	**0.282**	**0.358**	**0.047**	**-0.043**
5	**0.324**	**0.317**	**0.320**	**0.038**	**0.282**	**0.358**	**0.042**	**-0.041**
6	**0.324**	**0.314**	**0.320**	**0.038**	**0.282**	**0.358**	**0.042**	**-0.044**
7	**0.326**	**0.315**	**0.320**	**0.038**	**0.282**	**0.358**	**0.044**	**-0.043**
8	**0.317**	**0.314**	**0.320**	**0.038**	**0.282**	**0.358**	**0.035**	**-0.044**
9	**0.323**	**0.314**	**0.320**	**0.038**	**0.282**	**0.358**	**0.041**	**-0.044**
10	**0.325**	**0.312**	**0.320**	**0.038**	**0.282**	**0.358**	**0.043**	**-0.046**
11				0.038	-0.038	0.038	0.038	-0.038
12				0.038	-0.038	0.038	0.038	-0.038
13				0.038	-0.038	0.038	0.038	-0.038
14				0.038	-0.038	0.038	0.038	-0.038
15				0.038	-0.038	0.038	0.038	-0.038

center measurment with ultra sonic

Mean OUTSIDE DIA. Permissible +- 0.015									
Tube	highest	lowest	Mean	Nominal	Tolerance	min	max	min	max
1	**0.333**	**0.316**	**0.325**	**0.320**	**0.015**	**0.305**	**0.335**	**0.0195**	**-0.011**
2	**0.325**	**0.317**	**0.321**	**0.320**	**0.015**	**0.305**	**0.335**	**0.016**	**-0.014**
3	**0.332**	**0.311**	**0.322**	**0.320**	**0.015**	**0.305**	**0.335**	**0.0165**	**-0.014**
4	**0.327**	**0.317**	**0.322**	**0.320**	**0.015**	**0.305**	**0.335**	**0.017**	**-0.013**
5	**0.331**	**0.310**	**0.321**	**0.320**	**0.015**	**0.305**	**0.335**	**0.0155**	**-0.015**
6	**0.329**	**0.315**	**0.322**	**0.320**	**0.015**	**0.305**	**0.335**	**0.017**	**-0.013**
7	**0.327**	**0.314**	**0.321**	**0.320**	**0.015**	**0.305**	**0.335**	**0.0155**	**-0.015**
8	**0.329**	**0.312**	**0.321**	**0.320**	**0.015**	**0.305**	**0.335**	**0.0155**	**-0.015**
9	**0.327**	**0.315**	**0.321**	**0.320**	**0.015**	**0.305**	**0.335**	**0.016**	**-0.014**
10	**0.334**	**0.310**	**0.322**	**0.320**	**0.015**	**0.305**	**0.335**	**0.017**	**-0.013**
11			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
12			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
13			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
14			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
15			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!

OUTSIDE DIA. Permissible +- 0.038								
Tube	highest	lowest	Nominal	Tolerance	min	max	min	max
1	**0.333**	**0.316**	**0.320**	**0.038**	**0.282**	**0.358**	**0.051**	**-0.042**
2	**0.325**	**0.317**	**0.320**	**0.038**	**0.282**	**0.358**	**0.043**	**-0.041**
3	**0.332**	**0.311**	**0.320**	**0.038**	**0.282**	**0.358**	**0.050**	**-0.047**
4	**0.327**	**0.317**	**0.320**	**0.038**	**0.282**	**0.358**	**0.045**	**-0.041**
5	**0.331**	**0.310**	**0.320**	**0.038**	**0.282**	**0.358**	**0.049**	**-0.048**
6	**0.329**	**0.315**	**0.320**	**0.038**	**0.282**	**0.358**	**0.047**	**-0.043**
7	**0.327**	**0.314**	**0.320**	**0.038**	**0.282**	**0.358**	**0.045**	**-0.044**
8	**0.329**	**0.312**	**0.320**	**0.038**	**0.282**	**0.358**	**0.047**	**-0.046**
9	**0.327**	**0.315**	**0.320**	**0.038**	**0.282**	**0.358**	**0.045**	**-0.043**
10	**0.334**	**0.310**	**0.320**	**0.038**	**0.282**	**0.358**	**0.052**	**-0.048**
11				0.038	-0.038	0.038	0.038	-0.038
12				0.038	-0.038	0.038	0.038	-0.038
13				0.038	-0.038	0.038	0.038	-0.038
14				0.038	-0.038	0.038	0.038	-0.038
15				0.038	-0.038	0.038	0.038	-0.038